

I. Purpose

This paper has been written as a starting point for public input in identifying key policy, technical and process issues associated with the implementation of the Comprehensive Everglades Restoration Program (CERP).

The purpose of this paper is to outline a process and methodology for identifying and protecting water for the natural system and human uses which will be made available through implementation of the Comprehensive Everglades Restoration Plan (CERP) consistent with state and federal law. This paper also identifies technical and policy issues regarding assurances for existing legal sources, reservations of water for the natural system, and identification of regional water availability for consumptive uses and proposes guidance for Project Implementation Report (PIR) development.

It is anticipated that some of these issues will require further technical input by the state and federal partners in order to properly frame the implications of changing certain assumptions, particularly concerning the pre-CERP baseline and existing legal source identification.

A glossary of key terms and preliminary definitions has been included in Appendix A.

II. Summary of Relevant Legal Directives

A. Federal Water Resource Development Act of 2000

Congress enacted the Water Resources Development Act of 2000, Section 601 (WRDA 2000) to approve implementation of the CERP "as a framework for modifications and operational changes to the C&SF Project to restore, preserve, and protect the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection." (Sec. 601(b)). Several provisions in WRDA 2000 are set forth to ensure that CERP "be implemented to ensure the protection of water quality in, the reduction of the loss of fresh water from, the improvement of the environment of the South Florida Ecosystem and to achieve and maintain the benefits to the natural system and human environment described in the CERP..." (Sec. 601(h)(1), WRDA 2000). These are primarily contained in Section 601(h) entitled "Assurance of Project Benefits", which is attached as Appendix B. Some of the most relevant portions regarding quantification and protection of water supplies from CERP and existing legal sources are provided below as a short summary; however, none of these provisions should be read out of context of entire WRDA 2000 Act.

Section 601(h)(2) requires the execution of a binding agreement between the President and the Governor of Florida to ensure that, through State regulation or other means, "the water made available by each project in the Plan shall not be permitted for consumptive use or otherwise made unavailable by the State until such time as sufficient reservations of water for the restoration of the natural system are made under State law in accordance with the project implementation report for that project and consistent with the Plan." This Agreement was executed on January 9, 2002.

Section 601(h)(4) of the WRDA 2000 describes project specific assurances required for CERP projects. For Project Implementation Reports (PIR), the requirements include:

Sec. 601(h)(4)(A)- A Project Implementation Report shall:

- (IV) identify the appropriate quantity, timing, and distribution of water dedicated and managed for the natural system
- (V) identify the amount of water to be reserved or allocated for the natural system necessary to implement, under State law, sub clauses (IV) and (VI);
- (VI) comply with applicable water quality standards and applicable water quality permitting requirements under subsection (b)(2)(A)(ii).

For Project Cooperation Agreements, the requirements include:

Sec. 601(h)(4)(B)-

- (i) The Secretary and the non-Federal sponsor shall execute project cooperation agreements in accordance with section 10 of the Plan.
- (ii) CONDITION- The Secretary shall not execute a project cooperation agreement until any reservation or allocation of water for the natural system identified in the Project Implementation Report is executed under State law.

For Operating Manuals, the requirements include:

Sec. 601(h)(4)(C) - The Secretary and the non-Federal sponsor shall develop and issue, for each project or group of projects, an operating manual that is consistent with the water reservation or allocation for the natural system described in the Project Implementation Report and the project cooperation agreement for the project or group of projects.

Section 601(h)(5) provides a savings clause that applies when implementing CERP. It states:

(A) NO ELIMINATION OR TRANSFER—Until a new source of water supply of comparable quantity and quality as that available on the date of enactment of this Act is available to replace the water to be lost as a result of implementation of the Plan, the Secretary and the non-Federal sponsor shall not eliminate or transfer the existing legal source of water including those for—

- (i) an agricultural or urban water supply;
- (ii) allocation or entitlement to the Seminole Indian Tribe of Florida under section 7 of the Seminole Indian Land Claims Settlement Act of 1987 (25 U.S.C. 1772e);
- (iii) the Miccosukee Tribe of Indians of Florida;
- (iv) water supply for Everglades National Park; or
- (v) water supply for fish and wildlife.

B. State Laws Regarding Implementation of CERP

In 1999, 2000, and 2001, the Florida Legislature enacted a series of laws into Chapter 373 defining the SFWMD's and the DEP's roles in the implementation of CERP, including Sections 373.026(8), 373.1501, 373.1502, and 373.470, F.S. With regard to assuring project benefits, similar to WRDA 2000, Section 373.470(b) requires that the comprehensive plan be used as a guide and framework to ensure that the project components will be implemented to achieve the purposes of the "Federal Water Resources Development Act of 1996" S. 373.470(3)(b)2., F.S.

Prior to any project component being submitted to Congress for authorization or receipt of an appropriation of state funds, the DEP must approve each project component, pursuant to Section 373.026(8), F.S., upon a finding that the SFWMD has complied with the requirements set forth in Section 373.1501(5), F.S. Specifically with regard to assurances to natural systems, existing legal users and flood protection, section 373.1501(5) (a) and (d) require the SFWMD, as the C&SF local sponsor, to:

- (a) Analyze and evaluate all needs to be met in a comprehensive manner and consider all applicable water resource issues, including water supply, water quality, flood protection, threatened and endangered species, and other natural system and habitat needs.
- (d) Consistent with this chapter, the purposes for the Restudy provided in the Water Resources Development Act of 1996, and other applicable federal law, provide reasonable assurances that the quantity of water available to existing legal users shall not be diminished by implementation of project components so as to adversely impact existing legal users, that existing levels of service for flood protection will not be diminished outside the geographic area of the project component, and that water management practices will continue to adapt to meet the needs of the restored natural environment.

Prior to executing a project cooperation agreement, the SFWMD must develop a project implementation report with the Corps to address the requirements in Section 373.1501, and to obtain approval under Section 373.026 from the DEP. In addition, Section 373.470(3) requires that each PIR identify the increase in water supplies resulting from a project component, and that the such additional water supplies be allocated or reserved by the SFWMD under Chapter 373.

C. Water Resource Protection Tools Under State Law

The overall purpose of Chapter 373 is to ensure the sustainability of water resources of the state (section 373.016, F.S.). To carry out this responsibility, Chapter 373 provides the District with several tools with varying levels of resource protection standards. WRDA 2000, as well as Chapter 373 CERP implementation statutes, require that state law be used to protect water supplies for natural systems and humans, including both existing supplies and additional supplies made available by CERP. The following short summary of tools to protect water supplies for these purposes is provided below. These tools have various levels of resource protection standards. Water resource protection standards in Chapter 373, F.S. must be applied together as a whole to meet this goal.

1 **1. Reservations**

2
3 The reservations of water for the natural system will be made by the South Florida Water
4 Management District pursuant to state law. The SFWMD will accomplish the reservations
5 through the rule making authority of the Governing Board. The state law on water reservations,
6 in Section 373.223(4), F.S., provides:

7
8 The governing board or the department, by regulation, may reserve from use by
9 permit applicants, water in such locations and quantities, and for such seasons of
10 the year, as in its judgment may be required for the protection of fish and wildlife
11 or the public health and safety. Such reservations shall be subject to periodic
12 review and revision in the light of changed conditions. However, all presently
13 existing legal uses of water shall be protected so long as such use is not contrary
14 to the public interest.

15
16 When water is reserved, the district cannot allocate it to consumptive use permittees. Water
17 reserved for the natural system is for the "protection of fish and wildlife". However, water can
18 also be reserved for public health and safety.

19
20 Reservations are subject to periodic review based on changed conditions, such as the changes
21 that will occur in the Central and Southern Florida Project, as CERP projects become
22 operational. This provides flexibility to account for changes in implementation strategies and
23 contingency plans during the life of the project.

24
25 In Florida, existing legal uses of water have a level of certainty associated with their water
26 permitted rights. In regard to the relationship between permitted water rights and reservations,
27 existing legal uses are protected so long as they are not contrary to the public interest (Section
28 373.223(4), F.S.).

29
30 **2. Consumptive Use Permitting**

31
32 Consumptive use permits are issued by the water management districts pursuant to part II of
33 Chapter 373, Florida Statutes. Domestic uses of water are exempt from permitting requirements
34 but are protected by Florida law. In order to obtain a consumptive use permit, the permit
35 applicant must provide reasonable assurances that the use is "reasonable-beneficial", will not
36 interfere with any presently existing legal use of water, and is consistent with the public interest,
37 pursuant to Section 373.223, F.S. The SFWMD implements this three-prong test pursuant to
38 rules adopted in Chapter 40E-2, Florida Administrative Code. Permits are conditioned to assure
39 that uses are consistent with the overall objectives of Chapter 373 and are not harmful to the
40 water resources of the area (i.e., s. 373.219, F.S.).

41
42 Under Florida law, a consumptive use permit provides the permittee with the right to use water
43 consistent with the conditions of the permit for the duration of the permit. These permitted users
44 and domestic water users, which are exempt from requirements to obtain a permit, all have and
45 have the legal status of an "existing legal use". Prior to permit expiration, the permittee must
46 obtain a renewal of the permit in order to continue the water use. Existing legal uses of water

1 have a legal level of certainty that their permit will not be revoked or modified, or otherwise
2 impacted by the actions of third parties, consistent with state law. Under state law, existing legal
3 uses are protected unless they are determined to be detrimental to the water resources, in which
4 case they can be revoked or modified under Chapter 373, F.S. State law also provides specific
5 standards for reviewing pending consumptive use permit applications for a quantity of water that
6 is insufficient for meeting the reasonable-beneficial demands, or are otherwise competing for the
7 same limited source, pursuant to Section 373.233, F.S.

8 9 **3. Minimum Flows and Levels**

10
11 The District is responsible for the implementation of statutory provisions in Section 373.042,
12 F.S., which requires that the District establish Minimum Flows and Levels (MFLs) for
13 watercourses and aquifers. Generally stated, the MFLs for a given watercourse or aquifer shall be
14 the limit at which further withdrawals would be significantly harmful to the water resources of
15 the area. Minimum flows and levels for Lake Okeechobee, the Everglades and the Northern
16 Biscayne aquifer were adopted in 2000 in Chapter 40E-8, F.A.C. along with prevention and
17 recovery strategies consisting primarily of CERP components; specific consumptive use
18 permitting criteria for MFLs were adopted in Chapter 40E-2; and water shortage criteria were
19 adopted in Chapter 40E-21 and 40E-22. The District is also proceeding with efforts to develop
20 MFLs for associated areas, such as the Loxahatchee and St. Lucie estuaries by the end of 2002,
21 Florida Bay by the end of 2003, and Biscayne Bay and the Southern Biscayne aquifer by the end
22 of 2004.

23 24 **4. Water Shortage Plan**

25
26 Pursuant to Section 373.246, F.S., water shortage declarations are designed to prevent serious
27 harm from occurring to water resources. Serious harm, the ultimate harm to the water resources
28 that was contemplated under Chapter 373, F.S., is interpreted as long-term, irreversible, or
29 permanent impacts to the water resource, pursuant to District rule. Declaration of water
30 shortages by the Governing Board can thus be used as a tool to prevent serious harm, as provided
31 in Chapter 40E-21, F.A.C.

32
33 By basing the CUP criteria on a specific and uniform level of certainty, it is possible to estimate
34 how often water may be restricted by a water shortage declaration based on historical rainfall
35 records. Water shortage restrictions may be imposed due to climactic events, continued decline
36 in water levels, and/or saltwater intrusion and provide a means to curtail human use in the face of
37 decreasing supplies. Each water level trigger corresponds to a particular level of water shortage
38 restriction. These restrictions act to apportion the available resource among uses, including the
39 environment, in a manner that shares the adversity resulting from a drought event. Adoption of
40 resource protection criteria as water shortage trigger indicators also notifies users of the risks of
41 damage and potential for loss due to water shortages.

42 43 **5. Regional Water Supply Planning Requirements**

44
45 Regional water supply plans, including the *Lower East Coast Regional Water Supply Plan*
46 accepted by the Governing Board in May 2000, provide strategies that assure that adequate water

1 is available to meet future urban and agricultural, and natural system demands within the
2 planning area through the year 2020. Section 373.0361, F.S., requires that each regional water
3 supply plan be based on at least a 20-year planning period and include water supply and water
4 resource development components, a funding strategy for water resource development projects,
5 MFLs established within the planning region, an MFL recovery and prevention strategy, and
6 technical data and information supporting the plan. The *Lower East Coast Regional Water*
7 *Supply Plan* includes the CERP components planned within the South Florida ecosystem.

8
9 The water supply development component must include the quantification of the water supply
10 needs for all existing and projected future uses within the planning horizon, with a level-of-
11 certainty planning goal for meeting needs during a one in ten year drought event. It must also
12 include a list of water source options for water supply development, including traditional and
13 alternative sources, from which local government, government owned and privately owned
14 utilities, self-suppliers, and others may choose. For each option, the amount of water available,
15 the estimated cost of the project, and sources of funding must be identified.

16 17 18 **III. Conceptual Relationship between Water Supply and Demands for** 19 **Humans and Natural Systems, Resource Protection Tools and CERP**

20
21 Prior to human intervention, the water needs of the environment were a function of the natural
22 drainage patterns and hydrologic conditions. Hydropatterns were a function of natural drainage
23 features and rainfall distributions typically exhibiting higher wet season flows and levels that
24 decreased naturally as rainfall decreased during dry conditions. Human intervention changed
25 these natural drainage patterns through a reduction in the spatial extent of the natural areas, the
26 construction of levees, canals, and structures, and the introduction of human demands. These
27 changes included a reduction in groundwater levels near the coast for purposes of flood
28 protection that have resulted in changes to the spatial and temporal distribution of flows and
29 levels to the environment, and altered the timing and volume of water which was available under
30 pre-development natural conditions.

31
32 Human demands increase as a function of rainfall deficits as illustrated in Figure 1. One of the
33 goals for water supply planning is to achieve a level-of-certainty to meet human demands up to
34 and including a one in ten year drought condition. Under these conditions, the user must
35 demonstrate that a proposed rule is reasonable and beneficial, is in the public interest and will
36 not interfere with other existing uses. Consumptive use permitting criteria are intended to
37 prevent harm to the water resources up to and including the one in ten year drought frequency
38 ("no harm standard").

39
40 Drought conditions may cause even further reductions in groundwater levels and surface storage
41 which are vital for agricultural and landscape irrigation, potable use, the prevention of saltwater
42 intrusion, and the natural system. Human demands continue to increase when rainfall deficits
43 exceed a one in ten year drought event. Water shortage restrictions (40E-21) are imposed on
44 consumptive uses to moderate these increased demands in order to prevent "serious harm" to the
45 water resources.

1 Minimum flows and levels are established to identify the point at which “significant harm” to the
2 water resources or ecology is caused by further withdrawals (Chapter 373.042 F.S.). In order to
3 reduce the occurrence of significant harm to the natural system under drought conditions, the
4 Governing Board has established that a Phase 3 (Extreme) water shortage restriction will be
5 applied to human uses in order to moderate their demands. The relationships between water
6 reservations, minimum flows and levels, consumptive use permits and water shortage restrictions
7 are conceptualized in Figure 2.

8
9 WRDA 2000 requires a quantification of water to be made available for the natural system as
10 each PIR is developed. Furthermore, pursuant to the WRDA 2000 "Assurance of Project
11 Benefits Agreement" between the President and Governor, reservations will be made under state
12 law prior to a Project Cooperation Agreement (PCA) being executed. State law (373.470 F.S.)
13 requires that the PIR identify the increase in water to the natural system resulting from the
14 project component and that the additional water be allocated or reserved under Chapter 373.
15 Most, but not all CERP projects will make additional water available for the environment
16 through time as illustrated in Figure 1. As each project is completed, environmental performance
17 will progressively improve until the environmental response meets or exceeds that originally
18 envisioned in the *July 1999 Feasibility Report* as approved by Congress. The project specific
19 and system-wide performance relative to water supply, flood protection, and environmental
20 requirements will be evaluated as each PIR is developed and documented. Improvements to
21 environmental performance measures will continue through time in order to address potential
22 short falls in the Plan.

23 24 25 **IV. Key Concepts in Identifying the Pre-CERP Baseline and Existing Legal** 26 **Sources of Water**

27
28 The following section presents basic precepts and guiding principles in the identification of the
29 pre-CERP baseline and a proposed technical approach for defining and protecting existing legal
30 sources. Section IV.A describes general principles and associated issues in order to frame these
31 topics for public discussion and resolution. Resolution of these matters will be essential for the
32 identification of assumptions for the pre-CERP baseline condition model simulation and
33 ultimately the identification of existing legal sources. Appendix C includes an abbreviated
34 version of the proposed guiding principles associated issues and preliminary pre-CERP baseline
35 assumptions for quick reference.

36
37 The public process, which will include workshops and continued interaction with the Water
38 Resources Advisory Committee (WRAC), the South Florida Ecosystem Restoration Task Force
39 and Working Group, for resolving these issues will also include presentation of regional
40 modeling results of various scenarios that frame the ramifications of the outstanding issues being
41 discussed. Through the CERP RECOVER process, an on-going interagency team has been set
42 up to help identify the base case assumptions. This team has held several meetings, and has
43 begun to identify and discuss outstanding issues including those presented below. It is proposed
44 that the CERP RECOVER team discussions be integrated with efforts of the public discussion
45 process referenced above.

Sections IV.B through IV.E present a draft "straw-man" scenario for the identification of the pre-CERP baseline, a proposed method for quantifying existing legal sources and guidance for protecting existing legal sources through the development of PIRs. These sections will continue to be refined as the issues presented in IV.A are resolved.

A. Guiding Principles for Defining the Pre-CERP Baseline and Existing Legal Sources

1. Background

The overarching objective of the CERP under both state and federal law is restoration and preservation of the South Florida ecosystem while providing for other water-related needs, including water supply and flood protection.

Implementation of CERP must be consistent with both state and federal laws. In general, Federal law requires quantification and protection of existing legal sources of water and quantification and protection of water made available for natural systems by CERP through water reservation under state law. In general state law requires quantification of water made available by CERP projects, protection of existing legal users of water during CERP implementation, and reservation or allocation of water made available by CERP projects, pursuant to state law. State law also provides additional tools for protection of human and natural system water supplies through reservations of water for the protection of fish and wildlife, consumptive use permitting, water shortage management, minimum flows and levels, and regional water supply planning.

As a result of these legal requirements and as a first step in CERP implementation, the proposed process will: 1) present guiding principles and issues associated with defining the pre-CERP baseline; 2) define and quantify existing legal sources; and 3) define a procedure for identifying impacts to existing legal sources during PIR development.

2. Guiding Principles and Issues for the pre-CERP Baseline

In order to meet these legal requirements under federal and state law, it is necessary to identify a baseline that reflects the timing, quantity, and distribution, and quality of water from various sources under pre-CERP conditions within the South Florida ecosystem. This quantification is proposed to be accomplished through a "pre-CERP baseline condition" regional modeling simulation. However, the assumptions in the model first need to be defined. There are several different views regarding the meaning and interpretation of law and associated policies upon which the modeling assumptions should be based.

As a starting point to identify appropriate assumptions for the pre-CERP baseline condition, the following guiding principles are proposed along with issues that may surround these principles. The purpose of presenting these principles and issues is to solicit public discussion which will lead ultimately to resolution of outstanding issues. The process for resolving these issues will also include presentation of the results of various regional model scenarios that frame the issues being discussed and an evaluation of the effects of choosing one assumption over another.

1 General System-Wide/Regional Conditions:

- 2
- 3 • As a general principle, conditions will be based on the assumptions in the 1999 Restudy and
- 4 the 1995 base case of the *Lower East Coast Regional Water Supply Plan* updated to
- 5 December 2000 conditions. Deviations or exceptions to this general principle will be
- 6 explicitly defined (See Appendix C).
- 7

8 Issue – The assumptions used in the 1999 Restudy and the 1995 base of the LECRWSP

9 assumed 1995 conditions, these must be updated to reflect conditions as of December 2000.

10

11 Hydrologic Conditions:

12

- 13 • As a general principle, rainfall and evapotranspiration will be determined based on a period
- 14 of record for the regional hydrologic conditions from 1965 through 2000.
- 15

16 Issue – Which, of several available methods, of estimating supplemental irrigation

17 requirements should be used?

18

19 Physical Conditions/Structures:

20

- 21 • As a general principle, the structures and projects that were in existence as of December 2000
- 22 will be accounted for.
- 23

24 Issue – There were certain projects that were not constructed and operational in December

25 2000 but were federally authorized as of that date (e.g., C-111 and Modified Water

26 Deliveries). In addition, certain state mandated projects were under construction but not

27 completed and others that will be constructed in the near future (e.g., STA 1 East and STA

28 3/4). Should these projects be included in the pre-CERP baseline? If so, they will influence

29 operations, demands, and possibly existing legal sources.

30

31 Operational Conditions:

32

- 33 • As a general principle, operations in place as of December 2000 will be assumed.
- 34

35 Issue – Certain operations were considered to be “experimental”, or were under legal review or

36 development as of December 2000. Examples are the Everglades National Park (ENP) sparrow

37 issues vs. Interim Structure and Operation Plan (ISOP) vs. Interim Operation Plan (IOP) vs.

38 Combined Structure and Operation Plan (CSOP), S-9 litigation, ENP experimental water

39 deliveries vs. 1983 delivery authorizations and South Miami-Dade flood protection issues. How

40 should these conflicting legal and operational authorities be handled in the pre-CERP baseline?

41

42 Supply/Source Conditions:

43

- 44 • As a general principle, primary regional sources of available water include: 1) local rainfall,
- 45 surface storage and runoff; 2) Biscayne aquifer and other groundwater; 3) Water
- 46 Conservation Area storage and seepage; and 4) Lake Okeechobee.

- As a general principle, sources should be identified for large basins including, urban and agricultural service areas, and regional environmental areas.

- As a general principle, basins may have primary, secondary and tertiary supply sources as a function of hydrologic conditions and available storage.

Demand Conditions:

- As a general principle, urban and agricultural demands will be based on that amount of water depended upon to meet reasonable needs in urban and agricultural service areas.

Issue – Demands for urban consumptive uses could be assumed to be that amount actually withdrawn as of December 2000, or that amount which was permitted as of December 2000. Demands associated with agricultural consumptive use could be assumed to be based on the actual crop acreage that existed as of December 2000, or the acreage that was permitted to be irrigated as of that date.

Issue - The method of calculating evapotranspiration is important for estimating supplemental irrigation demand requirements for agricultural crops. Historically, this was done through the consumptive use permitting process by using a method known as Blaney-Criddle. Recent data suggests that this method over-allocates water necessary for the crop type. A newer method known as Agricultural Field Scale Irrigation Requirements Simulation Model (AFSIRS) was used in the modeling for the LECRWSP and Restudy, and is judged to be a more accurate demand estimate method.

Issue Many District rules are currently under rule development as a result of recommendations of the LECRWSP and as a result of the 2000 water shortage. There is a need to determine the process for addressing changes to rules outside of CERP such as supply-side management and water shortage rules.

- As a general principle, non-consumptive uses in urban and agricultural service areas will be accounted for as demands and will include deliveries for prevention of saltwater intrusion, wetland protection, aquifer recharge and other resource protection purposes.
- As a general principle, fish and wildlife demands will be based on historic operational deliveries under federal regulation schedules and other historic deliveries for beneficial uses by fish and wildlife within regional environmental areas, including the water conservation areas.

B. Definition of Existing Legal Sources

WRDA 2000 includes assurance language that provides for protection of existing legal sources as of the date of enactment, December 2000. These existing legal source considerations include agricultural or urban water supply, allocation or entitlement to the Seminole tribe, the Miccosukee Tribe, water supply for Everglades National Park and water supply for fish and wildlife.

Existing legal sources are proposed to be defined as:

The quantity of water available from all locations of which there was a dependence as of December 2000, consistent with Federal and State law for: 1) urban and agricultural existing legal uses, including those uses exempt from permitting requirements; 2) non-consumptive uses, including regional surface water deliveries and groundwater seepage for resource protection; 3) meeting the entitlement rights of the Seminole Tribe of Florida; 4) the Miccosukee Tribe; 5) federal and state requirements for Everglades National Park; and 6) protection of fish and wildlife.

Existing legal sources are proposed to be defined under the full range of available rainfall conditions to determine the quantity of water available under the operational, demand, and structural conditions that existed as of December 2000. The CERP design considered a much longer hydrologic period of record - 1965 through 1995. This 31-year period of record which included wet, average and dry rainfall periods was used to estimate the performance of various CERP components relative to water supply, ecosystem restoration and flood protection. The South Florida Water Management Model (SFWMM) is currently being updated to expand the hydrologic (rainfall) record to 36 years from 1965 through December 2000 and this is proposed to be the tool and rainfall period of record used in the determination of existing legal sources consistent with the CERP performance analysis.

The primary sources of available water include: 1) local rainfall, storage and runoff; 2) groundwater from the Biscayne aquifer; 3) surface water discharge and groundwater seepage from the Water Conservation Areas; and 4) surface water from Lake Okeechobee. One or several of these sources have been depended upon by fish and wildlife, urban, Tribal or agricultural uses, based on wet, average or dry rainfall conditions.

C. Spatial Identification of Existing Legal Source User Basins

It is proposed to consider spatially separating the major regions of the C&SF project in order, to properly determine each entity's dependence on existing legal sources. Proposed existing legal source user basins are shown on Figure 3 and are described in the following table:

Spatial Identification of Existing Legal Source User Basins

LEGAL SOURCE USER BASINS		SOURCE DEPENDENCE		
Agriculture	WCAs	Lake Okeechobee	Local Basin Rainfall	Surficial Aquifer
a. Lake Okee. North Rim Area		X	X	
b. EAA	X	X	X	
c. Calooshatchee		X	X	
d. St. Lucie		X	X	
Seminole Tribe				
a. Brighton Reservation		X	X	
b. Big Cypress Reservation		X	X	
Miccosukee Tribe				
a. Miccosukee Reservation	X		X	
Environmental				
a. Big Cypress Nat'l. Preserve			X	
b. WCAs 1,2,3	X	X	X	
c. ENP (incl. Fl. Bay)	WCA3	X	X	
d. Holey Land		X	X	
e. Rotenberger			X	
Urban				
a. Service Area 1	WCA 1	X	X	X
b. Service Area 2	WCA 2B	X	X	X
c. Service Area 3	WCA 3B	X	X	X
d. Northern Palm Beach County			X	X

D. A Method for Quantifying Existing Legal Sources through the Pre-CERP Baseline

Under the pre-CERP baseline condition (December 2000) agriculture, urban and environmental systems receive a certain quantity, timing and distribution of water from various sources including tributary basin runoff and direct rainfall. Direct rainfall can be considered a natural input, however, tributary inflow has typically been modified by manmade drainage features such as levees, canals, pump stations, and culverts. The hydropatterns of the existing environmental systems are reflective of the operational policies currently in place for the region as defined by regulation schedules, conveyance limitations, water control structure hydraulics for flood protection, water supply and environmental deliveries. These operational policies are also

reflective of existing consumptive use demands and delivery requirements from the regional system under the pre-CERP baseline condition.

A December 2000 pre-CERP baseline should be simulated for the regional system to estimate the amount of water available to the environment and other uses assuming historical rainfall conditions of 1965 through 2000, along with the baseline condition operational protocols, consumptive use withdrawals and water shortage policies. The performance of the system as of December 2000 can then be documented under wet, average and dry rainfall conditions. This performance will be documented through volume probability curves and used for performance evaluation for future PIR development and also as the basis for defining existing legal sources.

Although the pre-CERP baseline will document the performance of the system under all rainfall conditions, the proposal is to exclude regulatory discharges from the volume probability curves used to define existing legal sources as these discharges have not been historically depended upon by consumptive uses or the natural system. Additionally, these regulatory discharges are the main focus for capture and redistribution as part of the CERP program.

A water budget should be prepared for each of the existing legal source basins identified above and a set of volume probability curves developed which is indicative of the historical dependence of each existing legal source basin on local basin rainfall/storage and quantities of surface and groundwater from external locations (excluding regulatory discharges into the basin). Volume probability curves should be derived for the full 36-year period of historical rainfall conditions and also on an average annual, wet season and dry season basis to document seasonal distribution issues. Figure 4 depicts a conceptual volume probability curve.

The December 2000 pre-CERP baseline is proposed to include structural, operational, and demand assumptions as of that date for determination of existing legal sources consistent with state and federal law. Appendix C depicts the preliminary model assumptions for the pre-CERP baseline.

E. Proposed Procedure for Identifying Impacts to Existing Legal Sources Through PIR Development

Importantly, existing legal sources are not to be eliminated or transferred by the design of a CERP project unless the project makes up for (replaces) the water lost from the project. Specifically WRDA 2000 states that "until a new source of water supply of comparable quantity and quality as that available on December 2000 is available to replace the water to be lost as a result of implementation of the Plan, the Secretary and the non-Federal sponsor shall not eliminate or transfer existing legal source of water."

Some CERP projects will provide additional storage of storm water currently lost to tide, while others projects will reduce losses from a basin such as through seepage control. Both types of projects may result in an elimination or transfer of water however, the water quality implications of these types of projects may be quite different. While additional storm water storage may have large volume benefits, the water quality may be less than desirable dependent on the ultimate use. Conversely, seepage control may have not deliver additional water but will retain more

1 rainfall in a user basin with fewer potential water quality issues, especially for environmental
2 areas.

3
4 In order to evaluate a proposed CERP project's potential impact on an existing legal source user
5 basin, the SFWMM should be used to determine the regional effects of the proposed design on
6 existing legal sources. A volume probability curve for each existing legal source user basin
7 should be generated based on the design of the proposed CERP component prior to finalization
8 of the PIR. The proposed PIR volume probability curve should then be compared to the existing
9 legal source users volume probability curves (December 2000) and a determination made as to
10 whether there has been an elimination or transfer of the existing legal source for any user basin.

11
12 If no transfer or elimination of existing legal source water has occurred and the performance of
13 the PIR design is acceptable for both human and natural systems, then the PIR is finalized.
14 However, if a transfer or elimination of sources is indicated, and either the project has not met its
15 expected performance or does not make up for the quantity and quality of water transferred or
16 eliminated, then the design should not be acceptable and further iterations of the design must
17 occur prior to the PIR being finalized.

18
19 If the existing legal source has not been eliminated or transferred by the final design of the
20 proposed CERP project, then the PIR should: 1) contain all the necessary documentation
21 supporting the conclusion; and 2) affirm that the existing source water is not eliminated or
22 transferred by the project.

23
24 If the existing legal source has been eliminated or transferred, by the final design of the proposed
25 CERP project, then the PIR should: 1) document the volume and location of the elimination or
26 transfer; 2) identify the new or replacement source; 3) document how the project, as designed,
27 makes up for the volume eliminated or transferred; 4) document that the new or replacement
28 source is not affecting any other existing legal source user basin; 5) provide a predicative water
29 quality analysis which estimates that the water quality of the new source water from the
30 proposed project will be comparable to that of the existing source water quality; 6) affirm that
31 the existing source volume will not be transferred or eliminated until final construction testing
32 and operations of the proposed facility; and 7) include revised existing legal source user basin
33 volume probability curves for the affected basins which would be used by subsequent PIRs.

34 35 36 **V. Key Concepts in Protecting Water for Natural Systems and Human Uses** 37 **Made Available by CERP**

38
39 This section discusses key concepts raised in protecting water for the natural system and human
40 uses anticipated to be made available by CERP. They include: 1) quantification of existing
41 regional water availability for water supply service areas, 2) establishing a pre-CERP reservation
42 of water for the environment, 3) quantification of additional water for natural systems and human
43 uses made available by CERP; and 4) protection of CERP water supplies for their intended
44 purposes. Appendix D identifies a specific technical process for implementing these key
45 concepts and provides guidance for the Project Delivery Teams for identifying the amount of
46 water to be reserved for the natural system in the PIR process.

A. Quantification of Regional Water Availability for Water Supply Service Areas

The concept of Regional Water Availability (RWA) was first introduced in, and made a recommendation of, the *Lower East Coast Regional Water Supply Plan* (LECRWSP), which was accepted by the Governing Board in May 2000. The purpose of RWA is to protect the Everglades ecosystem from harm by providing an accounting of the available regional water to the Lower East Coast supply service areas. The RWA will be used for defining existing and future allocations in the consumptive use permitting process and the water available for non-consumptive uses for resource protection. By quantifying the available regional water we will be able to determine: 1) the quantity of water available to support existing and future demands for consumptive users in the Lower East Coast region, 2) the quantity of water available for resource protection (saltwater intrusion, navigation, recreation), 3) the quantity of water available to meet environmental deliveries including wetland protection. Regional water availability is proposed to be identified under a one in ten-drought year condition, which is the State's planning goal for level of certainty for consumptive users under a no-harm standard.

Identification of regional water availability is necessary in order to protect the water resources of the region while allowing for an optimization or more efficient use of the water for consumptive uses which is currently available or which may become available through time. Since the major environmental benefits of CERP projects are not likely to be realized for five to ten years, it is necessary to identify the rate at which both consumptive uses and environmental enhancement will increase through time as provided for in the LECRWSP and as anticipated under CERP.

Using the SFWMM, regional water availability will initially be identified from the pre-CERP baseline used for the existing legal source identification (Section IV). A one in ten-drought year will be selected from the period of record for the SFWMM that is representative of consumptive use permitting criteria, consistent with the Chapter 373 F.S. 1-in 10 drought year level of service goal.

An initial regional water availability rule is anticipated to be adopted after the pre-CERP baseline and existing legal sources are identified. As certain CERP projects are constructed and successfully operated, the RWA will be updated to identify the additional water made available for consumptive uses by the projects. These updates are contemplated to be performed at a minimum of every 5 years, or as CERP projects are constructed and must be consistent with existing legal sources and any reservations for the natural system. Likewise, the RWA will be updated to include other water use basins that may not currently be connected to the regional system (e.g. northern Palm Beach County area through the implementation of the North Palm Beach County CERP project).

Surface water and ground water deliveries to the Lower East Coast from the Everglades ecosystem during a one in ten drought condition should be accounted for by source and distributed to the appropriate water supply service area of that source. Water Conservation Area 1 deliveries should be distributed to Service Area 1, Water conservation Area 2a deliveries should be distributed to Service Area 2 and Water Conservation Area 3 deliveries (or as modified in the future) should be distributed to Service Area 3.

**B. Implementation of Regional Water Availability through Consumptive Use
Permitting Rules**

In order to assure that the volumes of regional water available for consumptive uses are not over allocated or likewise redirected to environmental restoration, an accounting procedure needs to be established in District rules and implemented through the permit application review process. In concept, this process would include the following steps:

1. The amount of regional water (surface water and groundwater seepage as applicable) available for both consumptive and non-consumptive uses within each service area would be quantified as described above. These volumes would be codified in District CUP rules based on one in ten dry hydrologic conditions, with considerations for system operations (such as canal operational stages), CUP demands and land use within the service reflective of the modeling assumptions from which the rules are adopted. Changes to the Regional Water Availability volumes, as a result of deployment of regional water resource development projects or even as a result of changes in the quantification methodology would require a formal change to the rule.
2. During the review of each individual water use permit within the service area, the applicant will be required to quantify the portion of the requested allocation that is regional water verses other sources such as groundwater storage. This evaluation would be needed for projects proposing uses that: a) withdraw surface water from primary or secondary canals that are maintained by regional water deliveries, b) withdraw groundwater beneath a primary or secondary canals that are maintained by regional water deliveries to a degree that cause seepage of regional water into the well(s), or c) withdraw groundwater at a location and of a magnitude to cause seepage of regional water beneath the levees along the Lower East Coast. The analytic methods used by the applicant to quantify the amount of regional water proposed for use by the project must be consistent with the methods and model used to define the total regional water available to the service area in the rule. Consideration of the use of an alternative source to the degree that they offset proposed demands on the regional system will also be evaluated and encouraged, such as through longer permit duration.
3. A ledger will be kept which documents the portion of regional water available to a service area that has been allocated to date. The amount of regional water proposed to be used by the permit applicant will be added to the existing uses in the ledger and compared with the total amount of regional water available to the service area defined by rule. The object is to not exceed the volume in the rule.
4. It is recognized that the total amount of regional water defined in the rule must meet both consumptive and non-consumptive uses in the service area. Non-consumptives uses of regional water will be protected by the permit applicant meeting the remaining conditions of permit issuance (such as salt-water intrusion prevention, isolated wetland protection, water conservation requirements etc.). In addition, the ledger volumes will be checked regularly (prior to the monthly Governing Board meetings or quarterly) using the same model and assumptions that were used to generate the original service area volume in the rule to see that

1 the total of consumptive and non-consumptive demands for regional water have not been
2 exceeded.

3
4 It should be recognized that this concept is subject to refinement or revision during the actual
5 rule development/rule making process. The RWA rule should also define what actions are to be
6 taken in the event that demands of a basin equal or exceeds the volume of regional water
7 available to the basin by rule.

8 9 **C. Establishing a Pre-CERP Reservation of Water for the Environment**

10
11 The Lower East Coast Regional Water Supply Plan recommended establishment of a pre-CERP
12 reservation of water for the Everglades Protection Area. The intent of this pre-CERP reservation
13 is to modify the current regulation schedules for the Water Conservation Areas and Everglades
14 National Park to a rainfall driven schedule which improves the timing, flow and distribution of
15 water for the enhancement and protection of fish, wildlife and vegetation.

16
17 Existing legal source protection may constrain, to some extent, the full implementation of
18 rainfall driven schedules as originally envisioned in the LEC Plan. Based on the current
19 definition of existing legal sources, these proposed rainfall driven volumes of water must not
20 redistribute the volumes associated with other existing legal source user basins from which there
21 was a dependence on December 2000, but may redistribute volumes identified for the natural
22 systems.

23
24 The Natural Systems Model hydropattern estimates and CERP environmental performance
25 measures will be used as the basis for the modeling analysis through the SFWMM with
26 considerations for the existing storage, conveyance and existing legal source constraints of the
27 current system. Once the modeling scenarios confirm that existing legal sources are not affected
28 and the environmental performance of the modeling output is acceptable, the environmental
29 delivery assumptions will be converted to operational rules. The modeling performance measure
30 output and the operational rules will then be subject to federal review and approval prior to
31 implementation.

32
33 The performance of the rainfall driven schedules will be documented through volume probability
34 curves for the entire 36-year period of historical rainfall. After Federal approval, the portion of
35 the rainfall driven deliveries which are projected to protect fish and wildlife will be reserved
36 from use through state rule.

37
38 Reservations for future CERP projects will then build on this pre-CERP Reservation as described
39 in the following section.

40 41 **D. Quantification of Additional Water for Natural Systems and Human Uses Made** 42 **Available by CERP**

43
44 The natural system and human water supply benefits of a CERP project should be reflective of
45 the expected performance of a facility or a group of facilities. These benefits are typically

1 judged by the ability of a facility to improve, or meet a set of agreed upon performance measures
2 that reflect restoration, water supply and flood protection goals.

3
4 Since the projects that comprise CERP are designed to work together to achieve the system-wide
5 goals and purposes of CERP, in most cases, the identification of benefits should be done on a
6 system-wide basis in addition to a project by project basis. For example, projects such as the
7 Indian River Lagoon, North of Lake Storage, and the EAA storage projects, to name a few, have
8 significant effects outside of their location. It is important that the identification of project
9 benefits be made for the entire system, and not just for the project itself, or the area where it is
10 located. Additionally, for some projects, such as the seepage management projects, the amount
11 of water made available by the project may not be readily determined unless a system-wide
12 analysis is done. Lastly, some projects, such as decompartmentalization, may not make
13 additional water available.

14
15 The system-wide approach that requires using system-wide hydrologic tools, such as the South
16 Florida Water Management Model, also avoids the potential for double counting that may occur
17 if separate localized models are used. The system-wide approach will also make it easier to
18 correct or modify the identification of water needed for the natural system based on the results of
19 the adaptive assessment program. There are some exceptions to the system-wide approach. For
20 those projects that are not physically interconnected to the features of the C&SF Project system
21 (e.g. Southern Golden Gate Estates Project), identification of water to be reserved for the natural
22 system should be done only on project-level basis.

23
24 The actual project water supply performance may be estimated and defined as: 1) an explicit
25 volume related to a specific climatic condition, or 2) a range of volumes related to the expected
26 performance of a project over dry, average and wet conditions based on historical rainfall trends.

27
28 Typically these performance measures would be judged against a base case that reflects a
29 “without project condition”. Regional and project specific computer models should be
30 developed which contain the site characteristics of the facility such as available storage and
31 inflow and outflow structures. Next, a set of operational rules should be developed for
32 determining how, when and where water is discharged into and out of the facility. A set of
33 rainfall conditions should be applied which typically reflect the long-term historical rainfall data,
34 unique to the proposed spatial location of the proposed facility. Finally, the models are run, and
35 the output is post-processed to graphical formats consistent with the identified performance
36 measures and the results are reviewed. Several iterations of model simulations may be necessary
37 to optimize the performance of the facility taking into account flood protection, water supply,
38 water quality, and environmental considerations

39
40 It should be noted that the quantification and accounting of water needed to be reserved, as
41 reflected in the PIR, could vary from the actual project performance after project construction
42 and during the operation phase. During the PIR development phase, evaluations are done on a
43 predictive basis, based on assumptions that the projects recommended in all previously
44 authorized PIRs are in place. This allows comparison of the effect of a project combined with
45 the other authorized CERP projects to the conditions prior to CERP (i.e., pre-CERP baseline

condition). Operations for a project will be refined when construction and testing are complete to optimize the operation of the C&SF project, plus those projects in place and operational.

As each CERP project is constructed and operational, regional water availability also will change requiring concurrent revisions to the regional water availability rule. These revisions will not only reflect the changes in the system-wide operations necessary to effectively implement each constructed project, but will also form the basis for potential increases in available supply for allocation to human uses.

E. Protection of Additional Water for Natural Systems and Human Uses Made Available by CERP

WRDA 2000 requires that water for the natural system be identified for each project in the PIR process and that a reservation or allocation of water be executed prior to the Project Cooperation Agreement (PCA) being executed. The reservation will provide assurances that the water from CERP projects directed to the natural system is set aside for environmental purposes and that consumptive uses are adequately protected. The PIR will also include water supply performance measures that will determine if existing consumptive use demands are met and if additional water is made available for future consumptive uses.

In order to protect existing uses and to define the water available for future use, the reservation rule must specify that the reserved water is not required to be delivered until a final operations manual is provided to the District and the facility is fully operational. In addition, if the facility results in a shifting of sources for existing uses, the rule should include conditions that the source shift will occur only after the project is constructed and operating and a final operations manual is provided to the District.

Since the PIR is a preliminary design document which is followed by detailed designs, construction, and final operating manuals, there is a high probability that the ultimate performance of the facility in question may change. This change may affect the amount of water initially reserved by rule for the natural system. The final performance of the facility may also substantially or minimally affect the amount of water available for consumptive users as estimated by the PIR. Likewise, RECOVER may identify, through time, additional facilities or operational changes that will fine tune the natural system benefits of a particular project which may require revisions to existing water reservation rules. Therefore, the reservation should be conditioned upon reevaluating the performance of the facility once constructed and operational.

Based on this information in the PIR, the reservation rule should include the following as an example:

1. **The original source of reserved water** (e.g. IRL storage reservoir);
2. **The conveyance route of the reserved water** (e.g. IRL storage reservoir to C-44 connector canal, to C-44, to C-44 STA, to Lake Okeechobee surface water, to Floridan Aquifer via ASR, to Lake Okeechobee surface water via ASR, to Miami canal via S-3, to Water Conservation Area 3 via S-8);

3. **The primary environmental benefit of the reserved water**, (e.g. reduced inflow to Indian River Lagoon and water conservation area 3 hydropattern improvement); and
4. **Whether the additional water made from the project and its operational protocol shifts sources for existing uses** (e.g. the St. Lucie Agricultural Area current supply source is C-23 Canal with an allocation of X-AF; IRL reservoir supplies Y-AF under one-in-ten year conditions; shift agricultural users water source from C-23 to IRL reservoir once project is completed, tested and operational).

System-wide operations may also be modified as a new PIR is designed and implemented. During the design of the project, operations of the regional system should be included in the analysis and necessary changes should be documented. After the project is constructed and operational, and concurrent with the development of the final operating manual, revisions to the existing system wide operating manual and regional water availability rule should be made to reflect the addition of the new CERP project. The process for the integration of state and federal protection of natural system water is shown on Figure 5.

Not only will the water available for future uses be identified as part of the PIR process, but also potential shortfalls in future demands will be identified and planned for as part of the five year updates of the *Lower East Coast Regional Water Supply Plan*. Changes in the projected water availability based on actual project performance, construction schedule adjustments, funding and institutional issues will require an ongoing strategy of periodic regional system-wide review to insure that both future water use demands and environmental goals are met. If a shortfall is projected for future consumptive uses, then periodic updates of the regional water supply plans under state law will identify the necessity of additional water resource development projects or water supply development projects, including conservation measures to make up for the shortfall.

VI. Relationship of Quantification of Water to be Reserved and Operating Manuals

The optimization of the next added increment modeling will serve as the basis for not only quantifying the water to be reserved, it will also be the model simulation from which the draft project operating manual will be derived. This draft project operating manual will be a part of the PIR, and will be consistent with the quantification of water to be reserved.

It is anticipated that the draft project operating manual will be refined through the detailed design and construction phases of project implementation while continuing to meet the operation goals as described in the PIR. Once a project is constructed and the operational/testing phase is nearing completion, the project operating manual will be revised and finalized to reflect the operations of the project that has been completed. While the operations of the completed project must reflect the original intent of the project as described in the PIR, it must be recognized that the relationship of the completed project with the operations of the rest of the C&SF project, including other CERP projects, that have been completed may differ from the draft project operating manual in the PIR. Consequently, it may be necessary to revise the reservation to reflect the constructed project and the associated operations. This will occur in at least two

circumstances: 1) when the projects that are assumed to be built in the next added increment of the PIR analysis differs from what is actually constructed at the time a projects operational/testing phase is completed and 2) when a project performance differs from what was envisioned in the PIR.

Timing and Relationship of Project Development, Quantification of Water, and Operating Manuals

Project Development Process	Stage of Quantification of Water	Stage of Operating Manual Development
PIR	Identify Quantity to be reserved	Draft Operating Manual
Detailed Design	Refine Quantity to be reserved	Update Draft Operating Manual
Plans and Specifications	Initial Reservation (adopted)	
PCA		Construction Phase Operating Manual
Construction		Operational Testing Phase Operating Manual
Operational Testing		
Post Operational Testing	Refine Reservation (if required)	Final Operating Manual
Fully Operational		